

**REMARKS**

**I. Status of the Claims**

Claims 1-31 are pending in this application, the independent claims being claims 1, 6-8, 12-14, 18-20, 24-26, 30 and 31. By this Amendment, claims 1, 5-8, 11-14, 17-20, 23-26 and 29-31 are amended.

**II. Summary of Office Action**

In the Action, the specification was objected to on formal grounds, and claims 1, 2, 3-5, 8-11, 14-17, 20-23 and 26-29 variously were rejected under 35 U.S.C. §103(a), as unpatentable over U.S. Patent No. 6,856,735 (Chang).

Reconsideration and withdrawal of the objection and rejections respectfully are requested in view of the above amendments and the following remarks.

**III. Allowable Subject Matter**

Initially, Applicants gratefully acknowledge the Examiner's indication that the application contains allowable subject matter, and that claims 6, 7, 12, 13, 18, 19, 24, 25, 30 and 31 are allowable over the prior art. In this regard, claims 6, 7, 12, 13, 18, 19, 24, 25, 30 and 31 have been re-written in independent form and are believed to be in condition for allowance; Applicants note claims 6 and 7 have been re-written in independent form without reciting the features of intervening claim 2 because Applicants submit the features added in original claims 6 and 7 distinguishing over the cited art. No new matter has been added.

**IV. Summary of Examiner Interview**

Applicants' attorney gratefully acknowledges the courtesies extended to him by the Examiner in granting a personal interview on June 30, 2005. In that interview, Applicants' attorney discussed various novel aspects of the claimed invention, and distinguished the claimed invention over the cited art. Applicants' attorney also presented proposed formal amendments to the specification to obviate the outstanding objections thereto.

It was agreed that the proposed formal amendments to the specification overcame the outstanding objections.

Examiners Wong and Connelly-Cushwa noted that (1) the proposed amendments to independent claims 1, 8, 14, 20 and 26 add the feature that the substrate and light guide are made of different materials; (2) the present application includes example embodiments including substrates and light guides having different materials (e.g., light guide = cycloolefin polymer, or Zeonex 48OR, and substrate = copolymer of styrene, butadiene and ABS or Toyolac 501; see, e.g., Fig. 1 & 2 and the written disclosure at page 9, first and second full paragraphs); and (3) the Chang '735 patent discloses a structure in which the substrate and light guide both are made of a same base material but having a different doping material added thereto. Accordingly, the Examiners requested that Applicants include either further amendments or remarks distinguishing/clarifying whether such differently doped but common base materials are covered by the term "different materials" as claimed.

**V. Formal Amendments**

The formal objection to the specification respectfully is traversed. Nevertheless, without conceding the propriety of the objection, the specification has been amended as to matters of form, including English spelling, grammar, idiom, syntax and the like. In particular, the disclosure has been amended at pages 8, 12, 16 and 24 to recite more clearly the feature of "dimensional variation due to water absorption (or *alternatively to the* water absorption rate)", to clarify the language in the written disclosure consistent with the original claims (see, e.g., claim 1 - "dimensional variation due to water absorption" vs. claim 8 - "water absorption rate").

**VI. Claim Amendments**

The rejection of claims 1-5, 8-11, 14-17, 20-23 and 26-29 over the prior art respectfully is traversed. Nevertheless, without conceding the propriety of the rejections, claims 1, 5, 8, 11, 14, 17, 20, 23, 26 and 29 have been amended more clearly to recite various novel aspects of the

claimed invention, with particular attention to the Examiner's comments. In particular, independent claims 1, 8, 14, 20 and 26 have been amended to recite the feature wherein the light guides and substrate are made of different materials. Support for the proposed amendments may be found in the original disclosure (see, e.g., Figs. 1 and 2 and the corresponding text at paragraph nos. [0029] and [0030] of the substitute specification). No new matter has been added.

## **VII. Claimed Invention**

The present invention relates to a novel optical transmission device comprising light guides each having light incidence/emissions sections, a substrate which fixes the light guides, and optical elements arranged on the substrate to match the light incidence/emission sections of the light guides. In one aspect, as recited in independent claim 1, the light guides and the substrate are made of different materials substantially equal in a coefficient of linear expansion and in a rate of dimensional variation due to water absorption. As used in the specification and claims of the present application, the term, "different materials" does NOT include materials having a same base material but having a different doping material added thereto.

In a similar aspect, as now recited in independent claim 8, the light guides and the substrate are made of different materials substantially equal in a coefficient of linear expansion and in a water absorption rate.

In another aspect, as now recited in independent claim 14, the substrate and the light guides are made of different materials, and a positional lag between the light incidence/emission sections and the optical elements arising from a difference between the light guides and the substrate in a rate of dimensional variation due to water absorption is not more than 300  $\mu\text{m}$ .

In another aspect, as now recited in independent claim 20, the substrate and the light guides are made of different materials, and a total of differences between the substrate and the light guides in a rate of dimensional variation due to linear expansion and the rate of the

dimensional variation due to water absorption is defined with respect to a specific relationship according to the light guide size, e.g., not more than 0.6% where the light guide size is 50 mm or less.

In a similar aspect, as now recited in independent claim 26, the substrate and the light guides are made of different materials, and a relationship between the substrate and the light guides is defined with respect to the light guide size, e.g., a difference in a coefficient of linear expansion is not more than 300% and a difference in a rate of dimensional variation due to water absorption is not more than 0.6% where the light guide size is 50 mm or less.

#### **VIII. Prior Art Distinguished**

Applicants submit the prior art fails to anticipate the claimed invention. Moreover, Applicants submit that there are differences between the subject matter sought to be patented and the prior art, such that the subject matter taken as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.

The Chang '735 patent relates to tap couplers for fiber optic arrays, and discloses a tap coupler device for an optical array formed either in a waveguide structure or in a V block in which a fiber array may be mounted. However, Applicants submit that the Chang '735 patent fails to disclose or suggest at least the above-described features of the present invention. Rather, the Chang '735 patent discloses various embodiments of a V block having a substrate made of silicon, glass, ceramic or other material, where the substrate is preferably planar silica on silicon and the waveguides are preferably of germanium doped silica embedded in undoped silica to provide index matching between the input and output fibers and the waveguides. That is, the substrate and light guide are made of the same base material having a different doping material. Nowhere does the Chang '735 patent disclose or suggest the recited relationships between the coefficient of linear expansion, rate of dimensional variation due to water absorption, water absorption rate, and positional lag between the light incidence/emission sections and the optical

elements arising from such properties, as disclosed and claimed in the present application, let alone disclose or suggest such relationships with respect to a structure including light guides and a substrate made of different materials, as disclosed and claimed in the present specification.

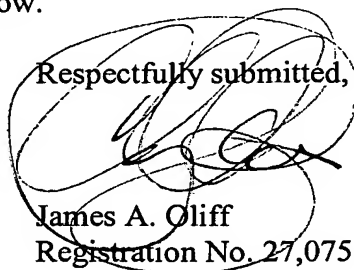
For the above reasons, Applicants submit independent claims 1, 8, 14, 20 and 26 are allowable over the prior art.

Claims 2-5, 9-11, 15-17, 21-23 and 27-29 depend from claims 1, 8, 14, 20 and 26, respectively, and are believed allowable for the same reasons. Moreover, each of these dependent claims recites additional features in combination with the features of its respective base claim, and is believed allowable in its own right. Individual consideration of the dependent claims respectfully is requested.

**IX. Conclusion**

Applicants believe the present Amendment is responsive to each of the points raised by the Examiner in the Official Action and the personal interview, and submit that the application is in condition for allowance. Favorable consideration of the claims and passage to issue of the subject application at the Examiner's earliest convenience earnestly are solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,  
  
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Attachments:

Amended Abstract  
Marked-Up Specification  
Clean Specification

Date: July 11, 2005

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